

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Customer No.
Luying SUN	:	26817
	:	
Serial No. 10/731,268	:	Group Art Unit: 1745
	:	
Filed: December 9, 2003	:	Examiner: WEINER, Laura S.
	:	
Title: NON-AQUEOUS ELECTROLYTES	:	Confirmation No. 4722
HAVING AN EXTENDED TEMPERATURE	:	
RANGE FOR BATTERY APPLICATIONS	:	
	:	
	:	x

Mail Stop Amendment
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

DECLARATION OF LUYING SUN
SUBMITTED UNDER 37 CFR 1.132

Sir:

I, Luying Sun, inventor of the above-described patent application, hereby declare as follows:

2. I understand that the above-identified patent application has been rejected under 35 U.S.C. § 102 as being anticipated or under 35 U.S.C. § obvious in view of JP 2000-113906 to Nishikawa et al. I have reviewed this reference. It is my opinion that the claims of the present application are non-obvious over the cited reference because the claimed non-aqueous electrolyte achieved superior results as shown by the following experiments.

3. Batteries were prepared using the electrolyte of the present invention as Sample E-2 and E-4 which include nitrile $N \equiv C - CH_2CH_2 - O - CH_3$ as described in Examples 2-5, 6 and 9 of the above-described application.

4. A comparative Battery No. 2 as described in Nishikawa et al. was prepared. Sample CE-4 includes nitrile NC-CH₂-CH₂-OCOO- having chemical bonding to the oxygen of the carbonate through two carbons.

5. Fig. 2 shows a comparison of voltage profiles of three batteries made using electrolyte Sample Nos. CE-4 (circle), E-2 (triangle), and E-4 (square) during first charge cycle to 3.9V. These three batteries were charged first at a constant current of 3.3mA to 3.5V, and then at a constant current of 6.6mA up to 3.9V. As illustrated in the figure 2, for the batteries made using electrolyte Sample Nos. E-2 and E-4, the battery voltage went up to 3.9V gradually. However, for the battery made using electrolyte Sample No. CE-4, the voltage went up to 3V and then decreased a little and then stayed at a voltage of below 3V for almost 130 minutes and then quickly increased up to 3.9V. This result indicated some side reactions of the electrolyte on electrode took place at the voltage of below 3.0V. Accordingly, the energy used for charging the battery was consumed mostly by the side reactions. As a result, the battery delivered very little discharge capacity (less than one eighth), 3.85-4.14 mAh compared to 33-35 mAh for the batteries made with the electrolyte of this invention (as shown in Table 2 of the above-described application).

6. These results indicated the electrolyte comprising a CE-4 in which the oxygen of the carbonate is chemically bonded to the carbon of the cyano with more than one carbon is not electrochemically stable up to 4.2 volts and could not be used for high voltage battery e.g. lithium-ion battery.

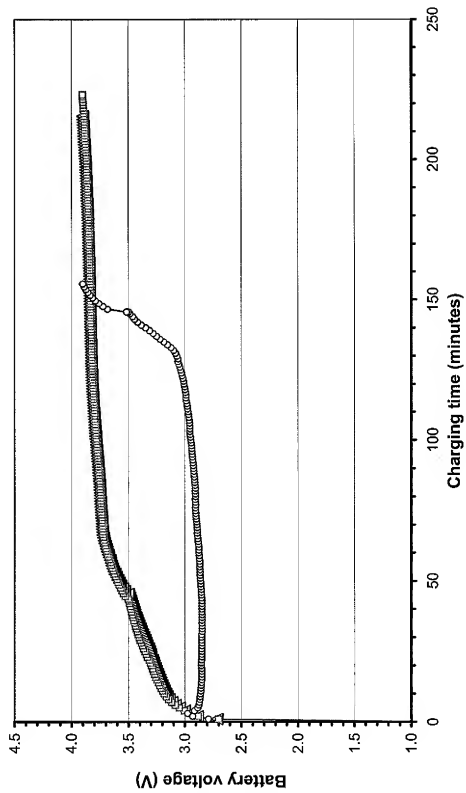


FIG. 2

7. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Dated: November 20, 2008By: 

LUYING SUN